

# **Appendix E: Ecological Design Principles**

## **General Principles**

1. Observe. Use protracted and thoughtful observation. Observe the site and its elements in all seasons. Design for specific sites, climates, ecosystems, and clients.
2. Connect. Use relative location: Place elements in ways that create useful relationships and time-saving connections among all parts. The number of connections among elements is more strongly correlated to healthy, diverse ecosystems than the number of elements.
3. Catch and store energy and materials. Identify, collect, and hold the useful flows moving through the site. Maintain and regenerate nutrients and habitat in the system.
4. Each element performs multiple functions. Choose and place each element in a system to perform as many functions as possible. Increasing beneficial connections between diverse components creates a stable whole. Stack elements in both space and time.
5. Each function is supported by multiple elements. Use multiple methods to achieve important functions and to create synergies. Redundancy protects when one or more elements fail.
6. Make the least change for the greatest effect. Find the “leverage points” in the system and intervene there, where the least work accomplishes the most change.
7. Use small scale, intensive systems. Start at your doorstep with the smallest systems that will do the job, and build on your successes, with variations. Integrate deficient systems before building infrastructure for new systems.

## **Principles for Living and Energy Systems**

8. Use the edge effect. The edge—the intersection of two or more environments—is the most diverse place in a system, and is where energies and materials accumulate. Optimize the amount of edge.
9. Accelerate succession. Mature ecosystems are more diverse and productive than young ones, so use design to jump-start succession.
10. Use/integrate biological and renewable resources. Renewable resources (usually plants and animals) reproduce and build up over time, store energy, assist yield, and interact with other elements. Whenever possible, use/integrate biology before technology.
11. Recycle energy. Supply local and on-site needs with energy from the system, and reuse this energy as many times as possible. Every cycle is an opportunity for yield. Loop energy systems. Employ habits or aspects of elements as functions toward regeneration.

## **Attitudes**

12. Turn problems into solutions. Constraints can inspire creative design. “We are surrounded by insurmountable opportunities.”— Bill Mollison
13. Get a yield. Design for both immediate and long-term returns from your efforts: “You can’t work on an empty stomach.” Set up positive feedback loops to build the system and repay your investment.
14. Abundance is unlimited. The designer’s imagination and skill is the primary limit to yield, more so than any physical limit.
15. Mistakes are tools for learning. Evaluate your trials. Making mistakes is a sign of trying to do things better. Difficult situations are our most concentrated learning opportunities.